Can the Modular Engineer Battalion Headquarters Be Multifunctional?

By Major William C. Hannan

The 5th Engineer Battalion received its deployment order for Operation Iraqi Freedom late in 2007 and deployed the following year. The battalion had recently transformed to the new modular structure, and its three mechanized companies became one sapper company and two mobility augmentation companies (MACs). Its projected mission in Iraq was route clearance, rapid crater repair, route sanitation, and culvert denial, so the battalion trained hard for those tasks. That training included a mission readiness exercise at the National Training Center, Fort Irwin, California. However, soon after deploying to Iraq, the battalion was involved in multiple construction projects across the areas of operation of two brigade combat teams (BCTs). Regardless of the type of engineer battalion or the missions its leaders expected to have, those BCTs needed immediate construction and technical support.

Engineer Modularity

The concept of engineer modularity is that an engineer battalion can command and control, plan, integrate, and direct the execution of two to five engineer companies (sapper, mobility augmentation, horizontal, vertical, multirole bridge, or other specialty unit), depending on the mission and engineer requirements. The majority of engineer battalions that have deployed to Operation Iraqi Freedom and Operation Enduring Freedom conducted operations across multiple engineer functions on an area basis. They have mostly performed combat and general engineering, but some also provided geospatial engineering. This arrangement offers many advantages over a single-function battalion that only conducts either combat engineering or general engineering missions. However, in order to capitalize on these advantages, the engineer battalion must organize and train correctly so it is able to conduct operations across all engineer functions.

While in Iraq, the 5th Engineer Battalion commanded and controlled two sapper companies, two MACs, a combat support equipment (CSE) company, a horizontal engineer company, and a multirole bridge company (MRBC), as well as an Air Force utility detachment and a geospatial team. Like most previous combat engineer battalions in its position, the 5th could easily plan and execute the combat engineering tasks and was able to quickly execute geospatial tasks that supported all operations. The biggest challenge for the 5th, and many of the other battalions deployed, was construction management or tasks within the general engineering function. Unfortunately, the new engineer battalion organization (see Figure 1) is not built to effectively manage construction operations.

5th Engineer Battalion Soldiers perform a culvert repair mission in Diyala Province, Iraq.

Battalion Staff Organization

Proper organization of the engineer battalion staff is the first hurdle to conducting construction management. The 5th Engineer Battalion managed the construction effort for one horizontal engineer company, one CSE company, and an Air Force utilities detachment (the equivalent of 6 horizontal platoons, 2 vertical platoons, and a utility repair platoon). Additionally,

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
AUG 2009		**00-00-2009 to 00-00-2009**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Can the Modular Engineer Battalion Headquarters Be Multifunctional?	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **U.S. Army Engineer School,14010 MSCoE Loop BLDG 3201, Suite 2661,Fort Leonard Wood ,MO,65473-8702**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

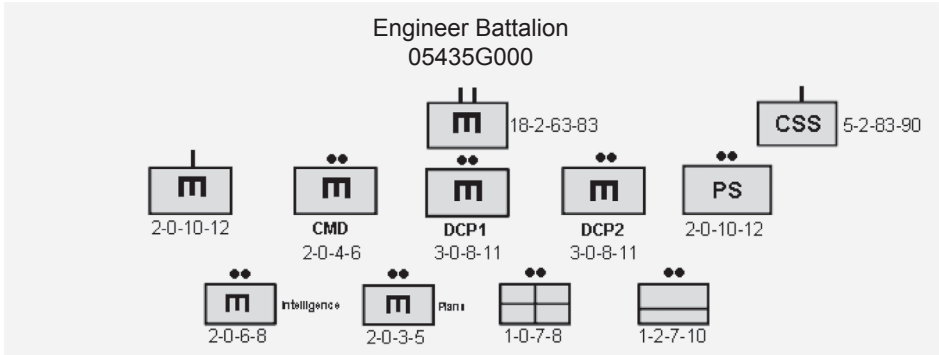
13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**5**	

Shaded Section: FM 3-34, Figure B-7, Page B9



MISSION

To provide an engineer headquarters for command and control of engineer operations in the AO.

CAPABILITIES

- Conducts engineer missions with 2-5 task-organized engineer companies and other force pool units.
- Provides command and control of units task-organized to the battalion.
- With task-organized engineer units, the battalion is capable of conducting engineer operations including combat and general engineering missions.
- With task organized combined arms units, the unit is capable of conducting of combat missions, when required.
- With task organized units, the unit is capable of conducting area damage control, when required.
- Provides unit administration, religious, and logistic support to task-organized units.
- Provides two scalable, deployable command posts as required.

DEPENDENCIES

- Appropriate elements of corps or division for religious, legal, health service support, finance, personnel and administrative, and logistical services.
- TOE 63357G000, FSC EN BN, for field feeding support, fuel and supplemental transportation of Class IV and V supplies as well as support for limited field maintenance.

SUPPORTS

- The battalion headquarters provides C2 for engineer operations supporting brigade, division, or corps operations.

RULE OF ALLOCATION

One engineer battalion headquarters per 2-5 engineer companies.

Figure 1

the battalion conducted quality assurance/quality control (QA/QC) inspections, performed the duties of a contracting officer technical representative, and assisted with technical scope-of-work reviews and project creation for BCT and provincial reconstruction team civil capacity projects. There was a tremendous need for technical planning, support, resourcing, and execution at the battalion level. The engineer battalion modified table of organization and equipment (MTOE) has construction noncommissioned officers (NCOs) with construction military occupational specialties (MOSs) throughout the staff structure (see Figure 2), but there is no construction cell to coordinate and synchronize efforts to ensure that the commander's priorities are being met.

The battalion restructured just before deploying, based on the need for deliberate construction planning and execution. Figure 3, page 68, shows how the 5th reorganized for Operation Iraqi Freedom. This restructuring was essential in order to provide efficient, quality construction. Although most of the needed MOSs were within the battalion MTOE,

Construction MOS Positions in Engineer Battalion

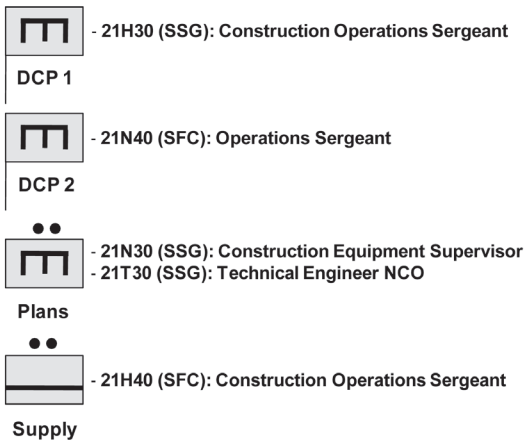


Figure 2

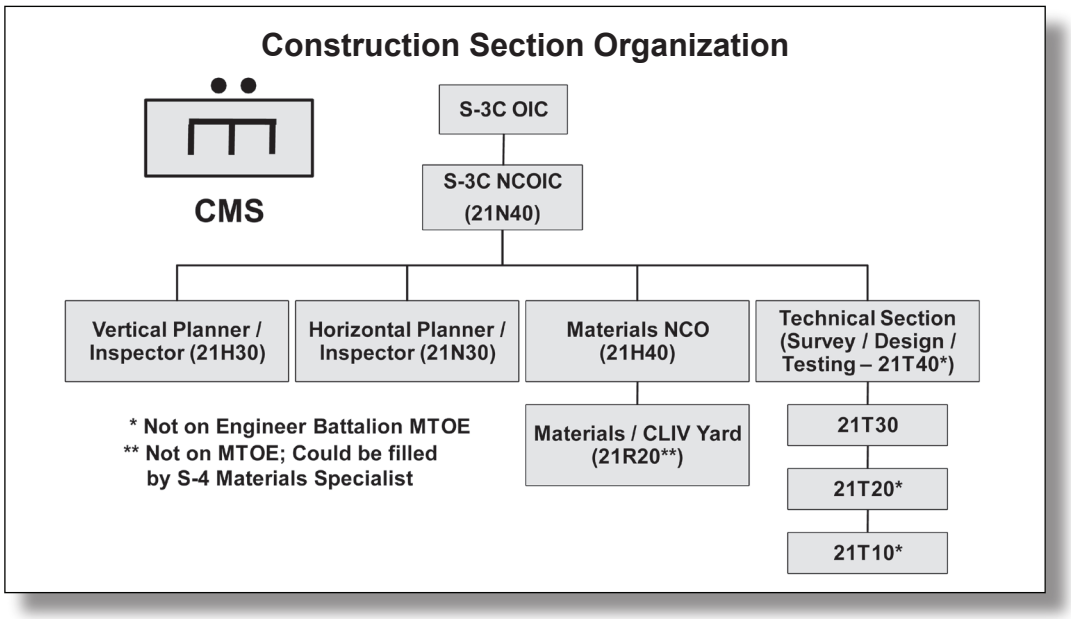


Figure 3

not having a dedicated construction management section (CMS) before deployment severely degraded construction management for the first six months of the deployment. Those six months were spent developing the battalion's construction systems, acquiring needed equipment and software, and delineating duties and responsibilities. An important MOS not included in the battalion MTOE was a technical engineering specialist, or 21T. The battalion is authorized one senior technical engineering specialist in the plans section, but in order to conduct survey, design, soil testing, concrete testing, compaction testing, and other technical requirements, a battalion needs at least four Soldiers with that specialty. The 5th deployed with one excess NCO with the specialty and pulled two more Soldiers with that MOS up to the battalion CMS from an attached company.

Technical equipment is also missing from the engineer battalion MTOE. When creating the technical section in the CMS, the battalion procured soils and concrete testing and analysis equipment, global positioning system survey instruments, electric density gauges, AutoCAD®, Theater Construction Management System (TCMS), and Microsoft® Project software. See Figure 4 for a list of the minimum equipment needed for a technical section at the battalion level. Under modularity, this gap could be fixed by attaching a survey and design team at an allocation of one team per three construction companies, but the reality is that engineer battalions often do not get this asset. Some engineer battalions with "combat heavy" roots had a survey and design team even if the battalion had fewer than three construction companies. While engineer brigades have a survey and design section on their MTOE, battalions cannot count on the brigade's team to support the battalion's requirements. Additionally, engineer battalions are often directly attached to divisions and need an internal capability for survey, design, and testing. Without the technical section and/or equipment, the battalion is unable to properly design projects or conduct QA/QC inspections. It is difficult for a battalion to enforce construction standards when it does not have the capability to test or build to a defined standard.

Technical Section Required Equipment

- LIN V71587 (NSN 6635-00-641-3641) – Test Set, Concrete
- LIN V64463 (NSN 6635-00-641-3642) – Test Set, Asphalt
- LIN V92959 (NSN 6635-00-641-3643) – Test Set, Soil
- LIN G44569 (NSN 6675-00-641-3610) – Drafting Equipment Set, Battalion
- LIN U70179 (NSN 6675-00-641-3639) – Tool Kit, Technical Engineering, Surveying
- LIN U71275 (NSN 6675-00-641-3600) – Surveying Set, Topographic Section
- W02673 (NSN 6635-01-030-6896) – Tester Density and Moisture Soil-Asphalt
- AutoCad, Microsoft Project, and a 42" Hewlett-Packard Plotter

Figure 4

Predeployment Training

The second concern for the engineer battalion is training construction management and general engineering tasks before deployment. Without a dedicated construction officer and CMS on the MTOE, units often overlook the need to train these tasks when not deployed. Units normally do not assign a construction officer unless they have roots as a combat heavy or construction effects battalion or have modular construction units attached in garrison. Additionally, construction NCOs on staff are often assigned as operations, schools, or training NCOs. With the loss of technical capability in the Engineer

A 5th Engineer Battalion survey team sights in a road during construction operations.

Regiment, it is even more important now to continue to develop technical skills in officers and NCOs.

Once the first obstacle is cleared and the battalion maintains a permanent CMS, the next step is to conduct individual and collective training. The construction officer needs to be a degreed engineer with skills in contracting, project management, survey and design management, writing technical scopes of work and construction directives, QA/QC, Microsoft Project, and TCMS. The NCOs in the CMS need similar skills, but specifically as they apply to their MOS or duty position. Collective training is more difficult for several reasons. First, engineer battalions are not multifunctional before they deploy, with a few exceptions such as the 54th Engineer Battalion in Germany. Most either have all-modular combat units, such as sapper or MAC companies, or modular vertical or horizontal construction companies. This causes weaknesses in both types of engineer battalions, although those with modular construction companies in garrison can usually transition easier into a multifunctional battalion. The engineer battalion without modular construction companies in garrison normally is not organized or trained to manage construction and has a much steeper learning curve when transitioning to a multifunctional battalion.

One potential solution to the issue would be to organize battalions in garrison as multifunctional battalions. When possible, engineer brigades should organize battalions with both modular combat and construction companies. This will enable the engineer battalion to train its staff across all engineer functions. For example, the 94th Engineer Battalion—previously a combat heavy unit but now composed entirely of modular construction companies—and the 5th Engineer Battalion—previously a corps mechanized unit but now comprising all modular combat companies—are both located at Fort Leonard Wood, Missouri, under the 4th Maneuver Enhancement Brigade. In order to enable the staffs of the 94th and 5th Engineer Battalions to train across all engineer functions, they could each give one organic company to the other battalion. If that was not feasible, they could attach companies to the other battalion for specific training events or construction projects.

Another issue affecting collective training is the ability to plan, develop, resource, and execute construction projects in garrison similar to ones that will be expected in a theater of operations. Every engineer battalion needs to work construction planning into its training plans, though it is often difficult because construction projects in garrison are difficult to resource and synchronize. The members of Air Force construction units are highly skilled in their specialties because they execute construction projects and continually work in their specialties while in garrison. For major training events such as a trip to the National Training Center, units should plan and resource construction far enough in advance to enable a construction unit to complete a project during or adjacent to a rotation. The planning of the project

Engineers clear and grub a road during construction operations.

would be training in itself. The focus should not be strictly on finishing the project within the rotation window, since that would limit the scope to small projects only. Rather, the focus should be on projects similar in scope to those the unit will build while deployed.

Quality and Efficiency Ensured

The 5th Engineer Battalion completed more than 150 construction projects during one Operation Iraqi Freedom deployment, including road construction and repair, helicopter landing zones, joint security stations, combat outposts, force protection construction and upgrades, Southwest Asia huts for housing expansions, electrical upgrades, and numerous other projects. The battalion was only able to ensure quality and efficiency after creating a CMS, acquiring the right technical equipment, and developing officers and NCOs with skills in contracting, project management, survey and design management, resource management, writing technical scopes of work and construction directives, and QA/QC planning. Much of this development was the result of on-the-job training. All engineer battalions should continue to build and retain great engineers, which requires a properly organized battalion CMS that improves technical capability through training focused on construction management.

Major Hannan is the operations officer for the 5th Engineer Battalion, Fort Leonard Wood, Missouri. Previously, he was the battalion executive officer; a sapper platoon leader, brigade engineer, and aide-de-camp in the 82d Airborne Division; United States Army, Europe topographic officer; company commander, planner, assistant operations officer, and brigade maintenance officer in the 18th Engineer Brigade; and small-group leader for the Engineer Captains Career Course, Fort Leonard Wood, Missouri. He holds a bachelor's in civil engineering from The Ohio State University and a master's from the University of Missouri–Rolla (now Missouri University of Science and Technology).